CLAIMS

1. A semiconductor photo-detecting element comprising, wherein

at least a buffer layer of the first conductivity type, a light-absorbing layer, a field buffer layer of the first conductivity type, a multiplication layer, an etching stopper layer, a buffer layer of the second conductivity type, and a contact layer of the second conductivity type formed on a semiconductor substrate in this order, and

a field strength applied to the etching stopper layer is lower than a field strength applied to the multiplication layer.

2. The semiconductor photo-detecting element according to claim 1, wherein

an impurity of the light-absorbing layer is the first conductivity type.

3. The semiconductor photo-detecting element according to claim 1, wherein

an impurity of the light-absorbing layer is the second conductivity type.

4. The semiconductor photo-detecting element according to claim 1, wherein

a breakdown electrical field strength of the etching stopper layer is lower than a breakdown electrical field strength of the multiplication layer, and in that the field strength applied to the etching stopper layer is lower than the breakdown electrical field strength of the etching stopper layer.

5. The semiconductor photo-detecting element according to claim 1, wherein

the breakdown electrical field strength of the etching stopper layer is lower than the breakdown electrical field strength of the multiplication layer, and in that the field strength applied to the multiplication layer is higher than the breakdown electrical field strength of the etching stopper layer.

6. The semiconductor photo-detecting element according to claim 1, wherein

between the multiplication layer and the etching layer there is provided a field buffer layer of the second conductivity type which relaxes the field of the multiplication layer.

7. The semiconductor photo-detecting element according to claim 6, wherein

an impurity of the multiplication layer is of the first conductivity type.

8. The semiconductor photo-detecting element according to claim 6, wherein

an impurity of the multiplication layer is the second conductivity type.

9. The semiconductor photo-detecting element according to claim 1, wherein

an impurity of the multiplication layer is of the second conductivity type and has an impurity concentration of not less than 1×10^{16} (cm^{-3}).

10. The semiconductor photo-detecting element according to claim 1, wherein

the multiplication layer is a single layer in which the ratio of elements forming the multiplication layer is constant.

11. The semiconductor photo-detecting element according to claim 10, wherein

the multiplication layer is a layer formed from InAlAs.

12. The semiconductor photo-detecting element according to claim 10, wherein

the multiplication layer has a thickness of not more than 0.3 μm.

13. The semiconductor photo-detecting element according to claim 11, wherein

the etching stopper layer is a layer formed from InP or $In_xGa_{(1-x)}As_yP_{(1-y)}$ $(0 \le x \le 1.0, 0 \le y \le 1.0)$.

14. The semiconductor photo-detecting element according to claim 1, wherein

the layer thickness (dm (cm)) of the multiplication layer, the impurity concentration of the second conductivity type (Ndm (cm^{-3})), and the magnitude of the electric field (ΔEm (kV/cm)) which relaxes the field strength applied to the multiplication layer satisfy the relationship $Ndm \ge k \times eO \times \Delta Em/(q \times dm)$; (where k is the dielectric constant of the multiplication layer, eO is the permittivity in a vacuum, and q is the elementary quantity of electric discharge).

15. The semiconductor photo-detecting element according to claim 6, wherein

the layer thickness (dk (cm)) of the field buffer layer of the second conductivity type, the impurity concentration of the second conductivity type (Ndk (cm^{-3})), and the magnitude of the electric field (ΔEk (kV/cm)) which relaxes the field strength applied to the multiplication layer satisfy the relationship $Ndk \geq k \times eO \times \Delta Ek/(q \times dk)$;
(where k is the dielectric constant of the field buffer layer, eO is the permittivity in a vacuum, and q is the elementary quantity of electric discharge).